

What is claimed is:

1. A process for producing a recombinant fibrinogen producing cell which highly produces fibrinogen, comprising incorporating, into an animal cell, genes encoding an  $\alpha$  chain (and/or variant of  $\alpha$  chain), a  $\beta$  chain and a  $\gamma$  chain (and/or variant of  $\gamma$  chain) which are polypeptides constituting fibrinogen so that the number of a  $\gamma$  chain (and/or variant of  $\gamma$  chain) gene is 1- to 1000-fold amount of a total number of an  $\alpha$  chain (and/or variant of  $\alpha$  chain) gene and a  $\beta$  chain gene.
2. The process according to claim 1, wherein the number of a  $\gamma$  chain gene is the same as a total number of an  $\alpha$  chain gene and a  $\beta$  chain gene.
3. The process according to claim 1 or 2, wherein a vector having a gene encoding an  $\alpha$  chain and a  $\gamma$  chain, and an expression vector having a gene encoding a  $\beta$  chain and a  $\gamma$  chain are used by mixing them.
4. The process according to claim 3, wherein a vector having a gene encoding an  $\alpha$  chain and a gene encoding a  $\gamma$  chain, and an expression vector having a gene encoding a  $\beta$  chain and a gene encoding a  $\gamma$  chain are used by mixing them at an equal amount.
5. The process according to any one of claims 1 to 4, wherein expression vectors pCAGGD-GB and pCAGGDN5-GA described in Fig. 1 are mixed at an equal amount, and this is incorporated into an animal cell.
6. The process according to claim 1 or 2, wherein a vector having a gene encoding an  $\alpha$  chain and a  $\beta$  chain, and an expression vector having a gene encoding a  $\gamma$  chain are used by mixing them.
7. The process according to claim 1 or 2, wherein an expression vector having a gene encoding an  $\alpha$  chain, an expression vector having a gene encoding a  $\beta$  chain and an expression vector having a gene encoding a  $\gamma$  chain are used by mixing them.
8. The process according to any one of claims 1 to 7, wherein an expression vector having a promoter selected from the group consisting of a SV40 early promoter, a SV40 late promoter, a cytomegalovirus promoter and a chicken  $\beta$ -actin promoter, and a marker gene for gene amplification selected from the group consisting of an

aminoglycoside 3' phosphotransferase (neo) gene, a puromycin resistance gene, a dihydrofolate reductase (dhfr) gene and a glutamine synthetase (GS) gene is used.

9. The process according to claim 8, wherein an expression vector having a chicken  $\beta$ -actin promoter and a dihydrofolate reductase gene is used.

10. The process according to any one of claims 1 to 9, wherein as a gene encoding an  $\alpha$  chain, one or both of a gene encoding a  $\alpha$  chain and a gene encoding an  $\alpha$ E chain which is a variant thereof are incorporated.

11. The process according to any one of claims 1 to 9, wherein as a gene encoding a  $\gamma$  chain, one or both of a gene encoding a  $\gamma$  chain and a gene encoding a  $\gamma'$  chain which is a variant thereof are incorporated.

12. The process according to any one of claims 1 to 9, wherein as a gene encoding a  $\gamma$  chain, one or both of a gene encoding a  $\gamma$  chain and a gene encoding a  $\gamma'$  chain which is a variant thereof are incorporated and, as a gene encoding an  $\alpha$  chain, one or both of a gene encoding an  $\alpha$  chain and a gene encoding an  $\alpha$ E chain which is a variant thereof are incorporated.

13. The process according to any one of claims 1 to 12, wherein the animal cell is selected from the group consisting of a Chinese hamster ovary cell (CHO cell), a mouse myeloma cell, a BHK cell, a 293 cell and a COS cell.

14. The process according to claim 13, wherein the Chinese hamster ovary cell (CHO cell) is a DG44 strain.

15. A process for producing a recombinant fibrinogen producing cell which highly produces fibrinogen, comprising incorporating, into an animal cell, a baculovirus P35 gene at the same time with or at a different time from genes encoding polypeptides constituting fibrinogen, in addition to the process for producing a recombinant fibrinogen highly producing cell as defined in any one of claims 1 to 14.

16. A recombinant fibrinogen highly producing cell obtained by a process as defined in any one of claims 1 to 15.

17. A process for producing a large amount of fibrinogen, comprising culturing a recombinant animal cell obtained by the process as defined in claim 15 by a culturing method at condition under which apoptosis is not induced.

18. A process for producing a large amount of fibrinogen, comprising culturing by any of a fed batch culturing method, a perfusion culturing method, and a culturing method using a nutrient enriched medium in a process for producing a large amount of fibrinogen using a recombinant animal cell as defined in claim 16.

19. A process for producing a large amount of fibrinogen, comprising using a serum-free medium in a process for producing a large amount of fibrinogen using a recombinant animal cell as defined in claims 16.

20. A process for producing a large amount of fibrinogen according to any one of claims 17 to 19, wherein a production amount of fibrinogen can be increased to about 4000 $\mu$ g/ml.

21. Fibrinogen produced by using a recombinant fibrinogen highly producing cell as defined in claim 16.

22. Fibrinogen produced by using a process as defined in any one of claims 17 to 20.